

# Psychological Bulletin

EDITED BY

SHEPHERD I. FRANZ, GOVT. HOSP. FOR INSANE  
SAMUEL W. FERNBERGER, UNIV. OF PENNSYLVANIA (*Assistant Editor*)

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## 2. NERVOUS SYSTEM

430. UHLENHUTH, E., The Internal Secretions in Growth and Development of Amphibians. *Amer. Nat.*, 1921, 55, 193-221.

Here are outlined the results of the author's experiments on thyroid and pituitary treatment of various amphibian larvæ together with brief discussions of the results from the numerous researches on amphibians which for the most part have been conducted since 1910. Thyroid treatment produces a remarkable acceleration of development sometimes with complete absence of growth. The changes of the relation between growth and development furnish an important link in the chain of facts necessary for an understanding of how the thyroid functions. This, as well as former studies, shows that amphibian metamorphosis is the result of a highly increased metabolism, under thyroid treatment, in which catabolism becomes faster than anabolism. This indicates and structural analysis shows that the early stages of metamorphosis are processes of atrophy rather than of constructive development although the latter may accompany. The author believes that the advance of the higher vertebrates from aquatic forms would not have been possible had it not been for the thyroid apparatus, although crucial experiments giving evidence of this view have not been performed. It is clear, however, that metamorphosis is initiated by thyroid products. The fact that certain of these changes, once initiated by thyroid action, continue automatically indicates that the problems of metamorphosis are extremely complex. Moreover, in amphibian development various groups of organs develop independently of one another, thus indicating that specific hormones or conditions control the growth of different groups of organs.

This entire field of research is of great importance for many reasons not least of which is the light which it may at any time

throw upon problems of evolution and the inheritance of acquired characteristics.

R. H. WHEELER (Oregon)

431. LARSELL, O., Nerve Terminations in the Lung of the Rabbit. *J. of Comp. Neur.*, 1921, 33, 105-132.

This paper contains a contribution to our knowledge of the nerve structures terminating in (1) the epithelium of the primary bronchi within the lung and at the points of division of the succeeding orders of bronchi, where there are evidently three functional types of terminations; (2) the smooth muscular fibers of the bronchial musculature where the nerve endings are probably motor and inhibitory; (3) the cells of the intrapulmonary ganglia where are found pericellular networks apparently of vagus origin; (4) the pulmonary artery, its branches and arterioles where is to be found a rich innervation of fibers concerned with the smooth muscle cells of the tunica media.

R. H. WHEELER (Oregon)

432. HALL, ADA R., Regeneration in the Annelid Nerve Cord. *J. of Comp. Neur.*, 1921, 33, 163-191.

Miss Hall studied regeneration in *Helodrilus calignosa* (1) after a simple cut of the nerve cord, (2) after removing two to four segments of the cord. She found (1) that there is a rapid formation of plug material which closes the wound. (2) This cicatrix material forms strands along which nerve fibers regenerate. (3) If the cut is through a ganglion large ganglion cells migrate into the strands. (4) When several ganglia are removed fibers and ganglia are replaced by outgrowths from both cut ends. Rate of growth for fibers in the annelid was about 0.1 mm. per day, considerably slower than the rate of 0.65 found by Ranson (1910) in the sciatic nerve of the dog. Bibliography and seventeen figures.

R. H. WHEELER (Oregon)

433. CRAIGIE, E. H., The Vascularity of the Cerebral Cortex of the albino rat. *J. of Comp. Neur.*, 1921, 33, 193-211.

The measurement of vascularity here taken was the total length of the capillaries enclosed in a given area. Samples from five areas were examined: the insular, præcentral, occipital, temporal and parietal. Eight brains were used. In all the five areas the 4th lamina (lamina granularis interna) was the richest in vascularity



followed in order by the third lamina (pyramidalis), the fifth (ganglionaris), the fourth (lamina zonalis) and the sixth (lamina multiformis). The latter was relatively richer in the insular region. The granular and supragranular layers tend toward a greater vascularity than do the infragranular layers. It seems probable that the former group is receptive and associative in function while the latter group is corticifugal. This is consistent with the lower centers in which it has been found that sensory and correlation nuclei are more vascular than are the motor. Sexual and racial differences appear to be more marked in the cortex cerebri than in other parts of the nervous system, suggesting that the vascularization of the more recently evolved centers is more susceptible to sexual, hereditary or environmental influences than that of the more ancient regions. The insular region is less vascular than other regions and differs from the rest more than do other areas differ from each other.

R. H. WHEELER (Oregon)

434. HERRICK, C. J., The Connections of the Vomeronasal Nerve, Accessory Olfactory Bulb and Amygdala in Amphibia. *J. of Comp. Neur.*, 1921, 33, 213-279.

Of special interest are the author's conclusions regarding the genesis of the amygaloid complex and his descriptions of the structural relations of the corpus striatum, the habenula and hypothalamus. The amygdala in the anuran is connected with the olfactory bulb (vomeronasal formation) by a secondary tract, the ventrolateral tract; it is connected to the opposite amygdala through the anterior commissure, and to the habenula, the medial olfactory areas and the hypothalamus. The hypothalamic nucleus of the olfactory projection tract is connected with the dorsal part of the thalamus, with the septal areas and probably with gustatory and other visceral systems and the pars nervosa of the hypophysis. The frog possesses a true corpus striatum which is related with the lateral forebrain bundle and which is quite separate from the lateral olfactory nucleus and the amygdala. The amygdala, then, was apparently differentiated under the influence of excitations from the vomeronasal organ but in higher forms of organisms other sensory systems modified the functional aspects of the amygdala as a whole until the primitive olfactory systems were suppressed without destroying the integrity of the surviving components of the amygaloid complex. The olfactory system in all vertebrates

has the dual rôle (1) of a visceral or interoceptive function concerned with the selection and digestion of food and (2) of a somatic or exteroceptive function concerned with environmental conditions. Such a study as this is important in throwing light upon the origin of the cerebral cortex for the reason that primitive olfactory systems and their connections played so dominant a rôle in phylogenesis. In this connection, however, one must bear in mind the dual nature of the sense of smell.

R. H. WHEELER (Oregon)

435. SPAETH, R. A., An Artificial Nerve. *Science*, n.s., 1921, 54, 360-1.

S. notes that Lillie has recently shown that apparently "the transmission of the momentary wave of activity which occurs in a passive iron wire on activation in 70% nitric acid is closely analogous both chemically and electrically to the passage of the nerve impulse." (R. S. Lillie, *Science*, 1918, 51, 43. *J. Gen. Physiol.*, 1920, 3, 107.) "The general similarity of the two phenomena was apparently first noticed by Wilhelm Ostwald" who called attention in 1900 to "the possibility of nerve transmission being a process akin to the transmission of activity." Acting on this suggestion, Heathcote experimented with iron in nitric acid and published a paper in 1907. (*J. Soc. Chem. Indust.*, 1907, 26, 899.) In this paper Heathcote stated that he had found "by direct experiments in the case of iron in nitric acid" that transmission of activity was naturally "slower immediately after the first transmission owing to products of reaction around the iron. . . . An effect of this kind in a nerve would explain the nature of 'fatigue' so far as it concerns nerves." S. states "It is not surprising that Heathcote's paper should have escaped the attention of physiologists. Lillie's independent rediscovery of this analogy, however, and his detailed studies and analysis strengthen the probability of a fundamental relation subsisting between the two phenomena."

S. describes an apparatus suitable for lecture table demonstration of the "passage of a wave of activation" over the surface of a No. 20 piano wire immersed in 70 per cent. nitric acid (by vol.) and connected with a demonstration galvanometer registering both positive and negative variations. (Picture of the apparatus accompanies the article.) When a zinc or copper stimulus is applied to the surface of the acid, there ensues a longer or shorter "latent period," after which the entire wire becomes activated and the

galvanometer registers a diphasic action current. With proper precautions, the preparation may be used repeatedly to demonstrate mechanical, chemical and electrical stimulation.

H. E. STARR (Pennsylvania)

### 3. SENSATION AND PERCEPTION

436. OLMSTED, J. M. D., Effect of Cutting the Lingual Nerve of the Dog. *J. of Comp. Neur.*, 1921, 33, 149-153.

Several dogs were anæsthetized and on the right side, 5 mm. of the lingual nerve just peripheral to the branch to the submaxillary gland were removed. In one dog, killed 8 days after the operation, taste buds had disappeared from 18 anterior fungiform papillæ on the operated side; in three papillæ one bud remained but was imperfect; 2 papillæ each had one perfect bud, one papilla having the remains of a second. On the unoperated side each papilla had from 2 to 5 perfect buds. In another dog, 15 days after operation, similar results were found. Check experiments proved that the disappearance of the taste buds was not due to shock incident on the operation. The process by which the taste buds disappear is one of degeneration with the aid of phagocytic leucocytes and not one of dedifferentiation or metamorphosis as was formerly supposed (Vintschgau, 1880 and Meyer, 1896). Epithelial cells take the place of the taste buds with an attending proliferation by mitosis from the germinative layer.

R. H. WHEELER (Oregon)

437. WHEELER, R. H., The Synæsthesia of a Blind Subject. *Univ. of Oregon Pub.*, 1, No. 5, 1920, 61 pp.

The investigator reports a series of very interesting descriptions of the various forms of synæsthesia characterizing the mental life of a subject who has been blind since eleven years old. As a basis for an understanding of this case of synæsthesia and with a view to a theory of synæsthesia in general, the author gives a lengthy review of the literature appertaining to the subject of synæsthesia and appends to his article a bibliography of one hundred and forty-five scientific, and twenty-two popular, references. Synæsthetic phenomena, in the form of colors and color schemata, for tones, music, letters of the alphabet, vowels and consonants, numbers, voices, proper names (geographical materials), abstract terms

and theories, tastes, odors, pressures, temperatures, kinæstheses, the days of the week, and the months of the year are described in detail and summarized. An especially interesting and valuable feature of the paper is the arrangement of descriptions of color schemata in parallel columns, to show that the lapse of time and forgetting effected very few changes in the colors and in their arrangements during several months and over periods of a year or more.

From the literature the investigator summarizes four classes of theories of the cause of synæsthesia: (1) a theory that it may be caused by some pathological condition, notably in the eye; (2) a theory that the cause is physiological, in the nature of anastomosis of fibers, irradiation of impulses, functional lack of differentiation in cortical areas, and the like; (3) the psychological theory of association by contiguity and repetition (which after all is still a physiological theory); and (4) a theory which combines both the physiological and psychological theories. Wheeler is inclined to the view that synæsthesia can be readily explained on the basis of the concepts of "reflex arcs" and "conditioned" reflexes; and he goes as far as to say that "in synæsthesia, the end effect," similar to the movement of a muscle or the action of a gland in a reflex arc, is "the associated image" of a color,—is the "implicit" response of a reflex arc (but the exact meaning of this term "implicit" he does not give, nor does he show how a muscular movement and a visual image are responses of the same kind and order in a reflex arc).

He has discovered a veritable gold mine of psychological material in the person of his gifted blind subject and has had great success in exploring into this mine and in developing the subject's ability to describe his mental equipment and his mental operations. Further researches on the synæsthesia of this subject are promised.

H. R. CROSLAND (Oregon)

## 5. MOTOR PHENOMENA AND ACTION

438. BAGBY, E., Psychological Effects of Oxygen Deprivation. *J. of Comp. Psychol.*, 1921, 1, 97-113.

The Henderson Rebreathing Apparatus was used by the Medical Research Board to test fitness for altitude flying. The subject's reactions were studied under conditions of progressive deprivation



of oxygen, results being quantitative test records, observations, and introspections. The tests included: visual acuity, auditory acuity, pitch discrimination, pressure discrimination, aiming, tapping, knee jerk, immediate reproduction, attention to serial reaction, addition. Results found were: that the most obvious effect of lessened oxygen supply was tremor and general muscular incoördination; that the attention field becomes restricted with a decrease in distractibility; that resting muscles change from relaxation to tension to twitching; that primitive emotional outbreaks showed removal of inhibitions in final stage; that intermittent testing showed "spurt" results.

Dunlap's standard psychological test adopted by the Board provides for a continuous performance demanding frequent shifting of attention, used with the rebreathing apparatus. Three parallel discrete activities are demanded: (1) touching stylus to buttons corresponding to lights being flashed; (2) keeping an ammeter at a given point by readjusting rheostat with changes in the current; (3) keeping a motor at low speed by reversing a pedal when speed increases. The psychologist is to make observations, especially as to the character of the subject's motor tendencies. The scoring of this test is weighted in the Bagby-Ross rating scheme.

J. F. DASHIELL (North Carolina)

439. HUMPHREY, G., Imitation and the Conditioned Reflex, *Ped. Sem.*, 1921, 28, 1-21.

Imitation is not to be conceived as instinctive or innate, but as an acquired reaction. Specifically, it involves a conditioned reflex the secondary stimulus of which is similar to the reaction. This secondary stimulus may originate either in the same or in another organism, so that imitation may be of self or of another. A child suffers pain, cries, hears himself crying and the last becomes the stimulus to further crying; cattle are fear-stricken, run in stampede, after which the sight of a running fellow serves as incidental stimulus for flight. Imitative units tend to become combined with themselves and integrated to form larger and larger wholes of imitative conduct; as chiseling, hammering, etc., to carpentering. No new material is learned by imitation, but only new combinations formed of activities already acquired. This points to a pedagogical danger in the use of imitation: a child first attempting to copy a movement is likely to import some of his already acquired motions and thus develop a "bad habit." A field of investigation is opened up, of

determining just when a given imitative task is not premature, does not presuppose sub-integrations not in the pupil's repertoire.

J. F. DASHIELL (North Carolina)

440. MUSCIO, B., Is a Fatigue Test Possible? *Brit. J. of Psychol.*, 1921, 12, 31-46.

Finally, we have before us a paper which fills a long felt need, namely, an analysis of the fundamental concepts of fatigue, and the suppositions which underly fatigue studies. Muscio begins by raising the question as to what fatigue really is and how it can be known. He points out very shrewdly that all the tests of fatigue thus far prove absolutely nothing, because in order to establish a measure of fatigue it is necessary in the first place to know just what we are measuring and how much fatigue is present. If we knew at the outset what fatigue was and what degrees of it existed from time to time, then the results of fatigue tests could be evaluated. In other words, it is impossible to find or to calibrate any fatigue test unless it can be correlated with units of fatigue which are already known. Muscio then proceeds to define the representative definitions of fatigue and finds that none of them present anything to which an objective technique can be applied. And in doing so, he upsets definitely and finally all those elaborate and refined biological and psychological fatigue studies to which so much weight has been given in the past. The objective results of all these studies has been nil in so far as they pretend to establish measures of fatigue.

In order to measure fatigue, since we do not know scientifically what it is, an assumption as to its character must first be made. And this assumption must be of such a nature that it will lend itself to objective observation. Muscio suggests, therefore, that fatigue be considered as "a condition (partly specifiable by reference to accumulation of metabolites and blocking in impulse paths) caused by activity, in which the output produced by that activity tends to be relatively poor; and the degree of fatigue tends to vary directly with the poorness of the output." If this assumption is accepted, it becomes possible to measure fatigue in terms of the quantity and quality of output, though even here, Muscio shows, there are many factors which will upset or modify the value of this criterion. Nevertheless, such an assumption must be made if we are to have a basis upon which to determine the value of proposed fatigue tests, or if we are to correlate the results of such tests with the expressions which have been assumed as characteristic of the fatigue condition.

These tests are of two kinds: performance tests, such as the commonly used muscular and mental tests, and non-performance tests, such as industrial accidents, consumption of power, variations in the blood-pressure, pulse, skin reaction, excretions, muscle tonus, etc. The performance tests are condemned because they usually interfere with the actions which are taken as the accepted characteristic expressions of fatigue, and above all, because their results are vitiated by practise. Non-performance tests, though presenting many difficulties, are the only tests which offer any possibility of establishing a convenient and practicable measure of fatigue.

Even if such tests can be found, their value is doubtful unless they can also aid in determining the points at which fatigue is inimical to health. Muscio therefore suggests, as does Watson, that the term fatigue be dropped entirely and that attention be concentrated upon methods for determining the effects of different kinds and amounts of activity upon mental and physiological functions, with the ultimate purpose of arranging work so that it results in a minimum of harm to the individual.

H. C. LINK (New York City)

441. Weber, E., Fortschritte in der Ermüdungsmessung. *Prak. Psychol.*, 1921, 2, 97-108.

This study begins with a discussion of the importance of determining fatigue, especially in the case of work requiring muscular exertion, and with emphasis upon its significance for the welfare of the laboring class. He clears the ground for himself by asserting that none of the methods of the past have contributed anything decisive to the solution of this problem, because none of them have distinguished between the primary or controllable stage of fatigue, and its secondary or uncontrollable stage. The unique feature of Weber's studies is just this discovery, namely, that there is a preliminary stage of fatigue which is not harmful to the organism, and a secondary stage which is. This discovery rests upon a further one, made by Weber fourteen years ago. He found that in any muscular exertion, whether local or general, the bloodvessels of the areas involved become distended and take up a greater supply of blood, whereas the bloodvessels of the abdomen and the periphery of the head, which are usually richly supplied with blood, are contracted. This change is cerebrally controlled, as Weber was able to demonstrate by means of electric stimuli applied to certain parts

of the brain and by means of suggesting to hypnotized subjects certain muscular activities which were not actually performed. To be sure, the activity of the heart is also stimulated by muscular exertion, but the presence of this centrally controlled vascular mechanism makes it possible to supply blood easily to the locality most in need of it, thus reducing the acceleration of the heart to a minimum.

Now, instead of a positive reaction, by which the bloodvessels of the affected area or areas are distended, a negative reaction, or a contraction of these vessels may take place. This occurs particularly in cases of neurasthenia, and in connection with mental exertion, but with such variations that it cannot be taken as indicative of exhaustion due to mental effort. On the other hand, the reaction is always positive where muscular effort is involved, and Weber found it so even in hundreds of cases of shock, hysteria, traumatic neuroses, and other central disturbances which he investigated. When muscular exertion has continued up to a certain point, the negative reaction sets in, and this can occur either in a local area, or throughout a more extended area. For example, the exertion of one arm may lead to a contraction of the vessels in that arm, whereas the other arm, which has been less exerted, will still be in the state of positive reaction. If this arm is exerted further, it also will show the negative reaction. Weber's explanation of this fact is that the increasing quantity of toxic substances in the blood finally affects the local sensory organs in such a fashion that the appropriate central motor areas respond with a negative motor impulse causing a vascular contraction in that area, while other areas may still be responding to a positive motor reaction.

It follows, therefore, that the point at which the positive reaction becomes negative, is the critical point of muscular exertion; for any further exertion of a particular area in which the bloodvessels have contracted throws the entire burden of furnishing the necessary blood supply upon the heart. This entails a very severe strain on the heart, for the heart not only must circulate blood through vessels below normal capacity, but must supply it at a rate considerably above the normal.

Weber claims for this discovery consequences of the utmost value. It can be used as a check on treatments for heart conditionst to determine the least exhaustive distribution of effort, the proper periods for various kinds of work, the length and frequency of rest periods, and the regulation of training or practise periods. The



task is complicated by the fact that the reaction times vary with each individual.

Weber measured these reactions by means of ergographs.

H. C. LINK (New York City)

442. BAUMBERGER, J. P., Fatigue and Error in Mental Occupation. *J. of Indust. Hygiene*, 1921, 3, 149-153.

A selected part of the output of eighteen clerks distributed over a period of one month, but totaling only about six actual days, was studied. The results showed little variation in quantity of work done at different times of the day, but more marked variations in accuracy. The investigator concludes that a normally recurring routine occupation of a few minutes duration is a valuable criterion of fatigue among clerks.

H. C. LINK (New York City)

443. WHEELER, R. H., An Experimental Investigation of the Process of Choosing. *Univ. of Oregon Pub.*, 1, No. 2, 1920, 59 pp.

Like a cat of nine lives, beliefs in and concepts of "a free will," "a will element," "psychic entities," "entities of self-consciousness and self-activity," "imageless thought," and "unconscious consciousness" have lingered persistently and die only after a furious struggle. Würzburg tried to perpetuate "psychical monads" and unconscious and conscious thoughts; Louvain attempted to immortalize "self-activity" and an element of willing; Wellesley is famous for a most able promotion of the doctrine of a "unique" and "unanalyzable" "consciousness of self"; and it has been alleged, unjustly, that Clark, with its faith attached to the introspective method, has used its hypodermics to keep the cat alive. Occasionally a flash of the animal's vitality is emitted from the Catholic University of America; and Columbia University once or twice has administered a stimulant.

But, contrary to the expectations of the critics of the Clark method, of introspection, Wheeler has accumulated data, obtained results, reached conclusions, and postulated interpretations which are in no whit offensive to objectivists or behaviorists and which should be of extreme service also to psychologists of a wholly different stamp. And, be it said, the reviewer regards Wheeler's results as being more detailed than and at least as accurate as data obtained by certain of our objectivists (notably the observations published serially by Ulrich, in *Psycho-Biology* and the *J. of Comp. Psychol.*, abstracted by the reviewer elsewhere in the *Bulletin*).

Wheeler's investigation, comprising over one thousand experiences of choosing, done with nine highly trained introspectors, consisted of four series,—choices of pictures, of cigarettes, and of musical selections, and of musical selections chosen without the use of certain specified muscles or kinæsthetic consciousness. Each experiment resulted in two main periods of experience: the fore-period characterized by the giving and accepting of instructions, preparation for the presentation of stimuli and the adjustments for the various steps in the choosing; and the main-period characterized by the various steps and stages of scrutinizing the stimuli, weighing of alternatives, accepting and rejecting of lines of choice, and the announcing of a choice. Vigorous and genuine choices were stimulated by really desirable stimuli (pictures, cigarettes, and music), promises from the experimenter that the observer would be allowed to enjoy the object of his choice, and specific instructions that the choice was to be a vigorous and genuine one.

In the main, the investigator found that all choices, and practically all steps in a choice, including the initial stages in the *Aufgabe*, were motor reactions or some form of kinæsthesia, indicative of explicit or implicit motor reaction, to the stimuli in question or to their use and to fulfilling the instructions. He most definitely failed to discover an intrinsic entity of "will," "self-activity," and "unconscious conscious thought"; and also failed to discover combinations, sequences, and concatenations of mental contents, other than those of a kinæsthetic nature and origin, as the core and essential content of all steps in a choice.

The final stage of a choice consisted in a terminating decision by the re-agent, called by the author the "fulfillment period";—it had been preceded by two periods termed respectively the "designative" and the "interpretative" periods. It was discovered that the latter two periods were unessential to the act of choosing and to the various acts in the choice.

The act of choosing is an unbroken continuum of steps or stages beginning in the fore-period, in the *Aufgabe*, and continuing until the choice is terminated; and consists of sequences of motor reactions, or the elimination of competing motor reactions. The ascendancy or supremacy of a given motor tendency is effected directly by re-enforcement or intensification or indirectly by the diminution of competing tendencies. Throughout the sets of stages, from *Aufgabe* to announcement of choice, there is a hold-over of a motor tendency or motor adjustment; it really began in the *Aufgabe*,

and consisted of a tendency favorable to one or the other of the alternatives, and finally culminated in the selection of this alternative, or its competitor, of similar age, finally predominated. The hold-over was weakened or strengthened as described above.

Excerpts from the introspections of only seven of the nine observers are published, and these by count arrange themselves as follows: J, 6; A, 5; B, 4; C, 4; D, 3; E, 3; and F, 1. In view of the criticisms that have been urged against Bühler's work at Würzburg, and in view of criticisms hurled against the introspective method by statistical, objective, and behavioristic psychologists, the reviewer feels that such criticisms should have been forestalled by the investigator in this instance, especially since he had accumulated over one thousand introspections. The reviewer would have been greatly interested also in a more detailed treatment of the functional operations of all mental contents or structures, including even that content of kinæsthesia which is of such fundamental importance in the investigation.

H. R. CROSLAND (Oregon)

## 6. ATTENTION, MEMORY AND THOUGHT

444. CRILE, G. W., A Suggestion as to the Mechanism of Memory. *J. of Comp. Psychol.*, 1921, 1, 201-211.

The conception of the organism as an electrochemical mechanism raises the question as to the explanation of the specificity of the sensory, central, and motor processes finding their way through the intricacies of the nervous system. It is suggested that sense apparatus may respond to stimulation with electric currents; the responses of the more delicate sense organs being made possible by electrical accumulators in the form of the nerve cell groupings at the peripheral endings of the sensory nerves. The electrical currents are carried centrally to the white matter of the brain as the recording matrix. Since the white matter possesses much oxidase, which implies metabolism, it may be conceived as fabricating electrical energy.

J. F. DASHIELL (North Carolina)

445. PERRIN, F. A. C., Conscious Analysis versus Habit Hierarchies in the Learning Process. *J. of Comp. Psychol.*, 1921, 1, 287-308.

The Bogardus fatigue test, balancing tests, and a two hand

coördination test were among several given as learning problems to adult subjects. When the subjects were asked to describe the objects of their attention during the learning, they mentioned stylus, metronome, buzzer, etc., merely enumerating the sensory experiences which necessarily accompanied the movements involved in learning. In all tests, successful variations in technique very frequently occurred without preliminary conscious analysis and insight, and very often even without conscious awareness of the variation after it occurred and was in the process of being incorporated. In general, the overt movements made by an individual to a motor test situation are largely independent of either his anticipatory ideas or of full awareness of these movements. That intense and definite conscious reactions may be elicited is granted, but the important point is that such consciousness is not of the cognitive but of an emotional character and may be concerned with effort, with conation in general.

The theory, then, of consciousness as essentially analytical in connection with motor habit development is challenged. Other theories briefly reviewed are the descriptions of the selective factor as recency, as feeling tone, and as frequency.

The author submits the conception of hierarchies of habits as a basis (along with the frequency factor) for explanation of the changes occurring. In no instance was a learning achievement found to consist merely of a sequence of coördinated habit acquisitions. The first duty was to acquire a gross, general attitude, then to perfect in turn the finer and finer reactions involved. According to this interpretation, it is not necessary to assume a trial-and-error process with consciousness as selecting the most fitting variant. The actual elimination appears only when an adjustment clearly is detrimental to learning, and it is a matter of inhibitions, special inhibitions for special reactions aroused by pain and other sensory stimuli, and general inhibitions due to failure in the gross total reaction. Many inefficient minor reactions are notoriously likely to be retained, and this is due to their failure to have aroused specific inhibitions.

J. F. DASHIELL (North Carolina)

446. FREELAND, G. E., A Year's Study of the Daily Learning of Six Children. *Ped. Sem.*, 1921, 28, 97-115.

A pioneer study of children's learning of typewriting was made with six normal children, one from each of first six school grades.



Each subject practiced ten minutes daily for five days a week, with usual school omissions, for a full school year. One child also re-learned the work three times in a period of four years. Results show that: children of these ages can learn typewriting, touch system, though the older ones learned it best; short vacations have varying influence on records; long vacations cause definite decrease in efficiency when function is not well mastered but little effect if in its later stages; initial performances give no indication of ultimate individual capacities; a very rapid gain in first three weeks was followed by much slower gain becoming at times doubtful; speed fluctuated more than accuracy, fluctuated independently of it, and was more easily improved; number of fluctuations decreased with age; fluctuations were due to manifold factors, as interest, physical condition, mental alertness; plateaus were reached but passed by special effort.

J. F. DASHIELL (North Carolina)

447. HALL, G. S., Gesture, Mimesis, Types of Temperament, and Movie Pedagogy. *Ped. Sem.*, 1921, 28, 171-201.

A plea is made for the study of the genesis, varieties, social values, etc., of greetings, pointings, pantomime, mimesis, and gestures signifying mental, moral, volitional, and sense processes; and a rich survey is given of the literature of these subjects. A suggestion is added concerning a four-fold division of human character types.

J. F. DASHIELL (North Carolina)

448. BARTLETT, F. C., and SMITH, E. M., Is Thinking Merely the Action of Language Mechanisms? (I). *Brit. J. of Psychol.*, 1920, 11, 55-62.

Basing the discussion upon Watson's "Psychology from the Standpoint of a Behaviorist," Chapter IX, "We therefore conclude that so long as attention is confined to a study of the conditions of expression and the variations of the thinking response, Prof. Watson's treatment is broadly upon the right lines, but must be regarded as inadequately developed in respect to its details. At the same time, the psychology of thinking, while it must be treated as a scientific study of the conditions and varieties of the thinking response, is only partially covered by an examination of the modes in which thought is expressed."

H. D. KITSON (Indiana)

449. Thomson, G. H., Is Thinking Merely the Action of Language Mechanisms? (II). *Brit. J. of Psychol.*, 1920, **11**, 63-70.

Thinking is a shortened form of trial and error. "I agree with what I imagine to be Professor Watson's criterion of language (or other 'implicit function'), namely that the essential point is substitution. But the substitution must be relevant substitution." "The whole point of substitution is that the substitute functions like the absentee *in a relevant way*. If one soldier goes on guard as substitute for another, he need not make up to look like him, but he must do the guard." Professor Watson's account shows "that the idea of 'leading on to' something is the essential of a 'true language habit.' See for example pp. 320-321. 'Box' is not true language habit when it merely accompanies the thing, but only when 'the child learns that the uttered word is a sufficient stimulus to cause the attendant to hand him the objects he names without actually having to execute bodily movements with respect to them.'"

H. D. KITSON (Indiana).

450. PEAR, T. H., Is Thinking Merely the Action of Language Mechanisms? (III). *Brit. J. of Psychology*, 1920, **11**, 71-80.

It is difficult to discuss the subject of this Symposium without mentioning the behaviorist's attack upon the doctrine of the image. Behaviorists should widen their scheme in order to admit the image. If "imageless thought" exists, here is the place for a behaviorist's theory of thinking. A scrutiny of Professor Watson's phrases suggests that some features of his exposition may be expressions of his own predominant kinds of imagery. (One comment upon many of his descriptions is that it would be interesting to know how much of his knowledge of the thought processes was obtained by any other process than that which psychologists usually call introspection.) The Watson descriptions may be true of a "motor-minded" person whose visual imagery is weak, but "it should be supplemented by accounts from the large numbers of persons whose powers have been bestowed in the inverse relation."

"It would be leading this discussion too far from its subject to speculate to what extent the extrovert type of mind tends to welcome behaviorism, the introvert to consider it inadequate. But a discussion between Professor Watson and Mr. Henry James, with, perhaps, Professor William James acting as interpreter, would have been invaluable."

"I cannot make up my mind whether the behaviorist really claims that the awareness of meaning is 'carried by' (or 'goes on in

terms of') these language processes, or is identifiable with them." "When we recall Professor James' description of thought as a series of flights and perchings, it seems that the behaviorist has given us an account of some kinds of perchings, and, fascinating as it is, it reads like a description of flying by an aerodrome mechanic, who sees only the last stages of the aviator's descent. But, to the upholders of the image, as well as to the behaviorist, the 'awareness of meaning' still remains an unsolved problem. Even if it turns out to be incipient behavior, there will, probably, still be room for its study, from the outside, by introspection."

H. D. KITSON (Indiana).

451. ROBINSON, A., Is Thinking Merely the Action of Language Mechanisms? (IV). *Brit. J. of Psychol.*, 1920, 11, 81-86.

To the general program of the behaviorist, "I answer that the Behaviorist statement (a) mutilates the essential problem of psychology," by limiting the subject-matter to physico-chemical changes in the body; "(b) neglects evidence which exists, is accessible and relevant to the understanding of human nature," such as the facts concerning imagery and the subjective aspect of affection; "(c) leaves the undoubted fact of consciousness an isolated and gratuitous miracle," with no relation to bodily affairs.

"As to the special question of thinking regarded as the action of language mechanism, . . . muscle and gland activity is not thinking, and nothing whatever can be gained by so regarding it." "The notion of substitution [as enunciated by Professor Watson] does not seem to work." For "what is there in the nature of a laryngeal response as such which can possibly label it as a substitute response of 'the larger musculature'?" "Similarly thinking could not be regarded as a case of trial and error. Error surely means that the agent does not get what he wants, and appetite and conation are outside the Behaviorist scheme of things."

H. D. KITSON (Indiana)

452. WATSON, J. B., Is Thinking Merely the Action of Language Mechanisms? (V). *Brit. J. of Psychol.*, 1920, 11, 87-104.

To answer first the charge that the behaviorist arrives at the concept of implicit thinking only through introspection, it may be said that "he can *at present* arrive at it only by making use of a logical inference. In those cases where the response to the stimulus is not immediate but where it finally occurs in some form of explicit

verbal or manual behavior, it is safe to say that something does go on, and that something is surely not different in essence from that which goes on when his behavior is explicit."

To take up now the main point of debate: The behaviorist would not assert that thinking is merely action of language mechanisms. Man thinks with his whole body and in every part. "We ought to make the term 'thinking' cover generally all implicit language activity and other activity substitutable for language activity . . . such as the implicit repetition of poetry, day dreaming . . . the shrug of the shoulder and the lifting of the brows." To sub-divide the whole process of thinking reveals three lines of cleavage: (1) Mere unwinding of vocal habits, such as saying the multiplication table. (2) "The solving of problems which are not new, but which are so infrequently met with that trial verbal behavior is demanded; illustrated probably by thinking of stanzas, partially forgotten." (3) A new problem calling for new adjustments to be "thought out." Here the process of "thinking" corresponds to the trial and error process in manual learning. "The process as a whole consists in the organized interplay of laryngeal and related muscular activity used in word responses and substitutive responses." . . . "Verbal manipulation along one line is checked and stopped and a new line is begun for exactly the same reasons that such processes are checked and begun in manual learning." "The thinking adjustment is completed when the final word-grouping or overt bodily reaction which comes as the end result of the process of thinking makes the initial stimulus to thinking inoperative or inert."

H. D. KITSON (Indiana)

## 7. SOCIAL FUNCTIONS OF THE INDIVIDUAL

453. DOCKERAY, F. C., and ISAACS, S., Psychological Research in Aviation in Italy, France, England, and the American Expeditionary Forces. *J. of Comp. Psychol.*, 1921, 1, 115-148.

Italian research included the use of a great variety of tests and accumulated a great mass of data. Tests were used to study reaction times, emotional stability, attention, muscular perception, and equilibrium. Reaction time studies included simple sensorial and muscular, choice reactions, and relation of nervous breakdown to reaction time; and certain amounts of differentiation and elimination were established. Emotional stability was measured by



plethysmograph, respiration, tremor, etc., and interesting relations found between emotional state and succeeding reactions of the simple and the choice types. Attention was studied in terms of extent, fluctuation, concentration, speed, etc., of perception, by exposure method; but these tests were not recommended for selection of aviators. Muscular perception, measured by ability to hold in constant place a lever with changing weights, was found to show different types of individual results. Equilibrium was studied by the Barany and other tests, and some relation to nervous exhaustion and recovery shown, but classification of candidates was not made.

French research has been limited to studies of reaction times and emotional stability.

British research was less interested in examination of candidates than in studies of staleness and of effects of altitude, especially by pulse, blood pressure, respiration, etc., also by dotting, balancing, giddiness, and tremor tests. The last was found to show high correlation with aptitude for flying.

American research overseas included a small number of examinations of student fliers but more important examination of exceptional service fliers. In rebreather tests the more expert pilots showed better maintenance of attention after disturbance of motor coördination, than did pilots examined in the States. A differentiation in reaction times was shown for moniteurs, chasse fit, and chasse unfit; however, only very low correlations were found with ratings in flying ability. In the steadiness test a correlation of .725 was found between absence of tremor and rating in flying ability. A test for selection of observers consisted of plates pierced with holes in different patterns admitting colored lights, to be observed and reported quickly. The lack of a good objective measure of ability in actual observing renders correlation coefficients useless. The only distinguishing point was quickness in recognition of "same" and "different" patterns. Close acquaintance with fliers indicated that personality was very important, much individualism needing to be recognized; although the high strung temperament was inferior to the quiet and methodical.

J. F. DASHIELL (North Carolina)

454. McCOMAS, H. C., Controlling the Airplane at Twenty Thousand Feet. *Sci. Mon.*, 1921, 12, 36-46.

The effects of altitude upon the aviator include those of temperature, pressure, and oxygen diminution. Little is known of the

first. Pressure affects the eardrums and the sinuses of the cranium producing headache. Lowered oxygen tension affects certain sensory mechanisms, as in impairment of vision though not of hearing; and certain motor mechanisms, as in early onset of fatigue and disturbance of coördinations. Does it affect central processes? A discrimination reaction test was employed at Mineola, employing an aviator's seat and controls consisting of stick and rudder bar, placed in a low air-compression chamber, the stimulus appearing as a card exposure bearing indications of proper movement of stick and rudder. The subject was given series of fifty tests each at four different altitudes. The higher altitudes seemed not to affect the reaction time significantly, and it seemed that the control of the mechanisms involved was handed to the lower centers. That the higher brain functions were clearly affected appeared from introspective reports, in which drowsiness, irritability, and exhilaration figured.

J. F. DASHIELL (North Carolina)

455. BREGMAN, E. O., A Study in Industrial Psychology-Tests for Special Abilities. *J. of Applied Psychol.*, 1921, 5, 127-151.

A report of an investigation with the purpose of developing tests for the use of the Employment Department of R. H. Macy & Co., Inc., is presented for comment and criticism. In the large department store methods of obtaining reliable criteria for work ability of sales clerks and clerical workers were carefully developed: Workers were grouped into three classifications, very good, poor and average, and tested with a series of mental tests. Only those workers were tested who were *consistently* placed in one of the three classifications by all available criteria. The good and poor sales-clerks when tested gave negative coefficients of correlation, some markedly high. Similar groups of clerical workers likewise tested gave positive correlations, not so high.

New tests were devised which were similar in form to those that gave the highest correlations. These tests differed in content by being less academic, more industrial. These new tests and several others were given to a group of 100 average sales clerks and 43 average clerical workers. The regression equation was determined for the three tests which, taken singly, gave the best correlations. The best weightings for these tests when combined were thus determined. These tests are now being used in connection with the employment of sales and clerical workers.

The author hopes to present data resulting from the follow up of the work of employees so tested.

E. MULLHALL ACHILLES

456. DOANE, S. E., Light Much Neglected in Efficiency Promotion. *Nation's Health*, 1921, 3, 440-443.

If some of the attention the eye has commanded as a fine instrument of accommodation were transferred to the consideration of its limitations, many obscure causes of ill health, fatigue and unrest would be eliminated. In illuminating the workplace, the hygiene of the eye needs to be considered first, the adaptation of the worker second, and increased production last; but all these interests are equally served by scientific lighting. Psychology as well as Physiology enters into successful lighting.

M. E. GALLAGHER (Pennsylvania)

457. BROWN, P. K., Vocational Training vs. Occupational Therapy. *Nation's Health*, 1921, 3, 536-539.

Ten years of experience with ergotherapy at Arequipa, a sanatorium for tuberculous wage-earning women, carried on under strict medical supervision and limited to certain hours of work a day, has put emphasis on such occupation as may lead to some practical advantage to the patients. Picture puzzles and playing cards are well enough in their way for certain minds, but if it is worth undertaking the task of keeping these minds interested on an ever advancing plane, it is worth the time of a skilled teacher to make the work as vocational as possible. The more a sanatorium is conducted as a school the better the morale and a better grasp of the individual problems is given both to the director and the patient. Work is contagious and the creative instinct is strong in most people.

M. E. GALLAGHER (Pennsylvania)

458. GILBRETH, F. B., Practical Methods of Fatigue Elimination. *Nation's Health*, 1921, 3, 523-525.

The first work of those who advocate and practise fatigue study is to arouse a general interest in this study, and especially in the elimination of unnecessary fatigue. All the work of the Committee of the Society of Industrial Engineers has lain, thus far, along the lines of arousing interest and surveying present practice and showing what has been actually done in fatigue elimination and its study.

Fatigue elimination standards and their exhibition where they will be available to all is the next goal of the Committee.

M. E. GALLAGHER (Pennsylvania)

459. BASCH, V., Le maître-probleme de l'esthétique. *Rev. Philos.*, 1921, 92, 1-26.

What is esthetics and what is its real field? The writer endeavors in this inquiry to correct the view that he presented in his earlier work, *Essai Critique sur l'Esthétique de Kant* (1896), when he gave to feeling so overwhelming a rôle as to exclude the proper intellectual factors.

Esthetics concerns itself with the exterior appearance of objects, not with their elements. In cognitive terms it consists in the awareness of the sensory qualities of the object, of its form and of the associations aroused by it which give it meaning and experiential setting. But to stop here were to be merely cognitive. The mind, after noting the presence of the qualities, returns to the exterior, to the appearance of the object. The essential characteristic of the esthetic attitude is an activity of the Me, a particular manner the Me has of beholding, of understanding and interpreting the object. Thus esthetic contemplation is purely subjective.

After the cognizing comes the esthetic feeling (though of course the two activities are inseparable). Feeling must be present, as it is the first and most natural response of the Me to the objects of the external world. True, it takes on more and more intellectual trappings as man becomes more and more highly civilized, but it remains ever the base of consciousness. The essence of the feeling phase of the attitude is, Does this thing bring me pleasantness or unpleasantness?

With feeling come tendencies toward movement, movement toward the pleasant object and movements away from the painful one. These movements grow and develop into the stuff of memory, habit, comparison. The observer learns to localize them, and thus learns to distinguish between the Me and the not-Me. This phase completes the "auto-projection" [empathy] on the part of the observer, who feels himself actually "to have become line, rhythm, sound, cloud, wind, rock, brook."

H. D. KITSON (Indiana)

460. MARRIOTT, C., Mind and Medium in Art. I. *Brit. J. of Psychol.*, 1920, 11, 1-8.

We cannot consider form apart from the means by which it is



produced, for example, the classic style of architecture apart from the stone which lends itself so well to it. (How would the Parthenon look made out of brick!) To recognize the dependence of the one upon the other is to have a good guide to artistic education and psychological experimentation. In place of the "two views of art as generally held; that it is primarily the representation of nature, and that it is primarily the direct action of abstract form, color and proportion, or in general terms, of design," the view is proposed that "art is primarily the characteristic use of materials, and that the representation of nature and the direct action of design are both incidental to that." Among the advantages of this view, the two most important are: "it brings all practitioners of the same art into the same category"; and "it brings art into close relations with all other forms of human activity in work and play."

H. D. KITSON (Indiana)

461. WALKLEY, A. B., Mind and Medium in Art. II. *Brit. J. of Psychol.*, 1920, **11**, 9-14.

The 'practical' explanation offered by Mr. Marriott can never answer the question, What is art? We shall have better luck if we look within to the imagination of the artist. The esthetic activity is really internal, the idea in the mind of the artist, who may or may not externalize it in a "work of art." The medium of expression is only a part of the 'historic situation' through which the idea becomes externalized.

H. D. KITSON (Indiana)

462. WATT, H. J., Mind and Medium in Art. III. *Brit. J. of Psychol.*, 1920, **11**, 15-25.

Sensory data from the media of a work of art indisputably play a part in esthetic enjoyment. It is impossible, however, to set up limits.

H. D. KITSON (Indiana)

463. BULLOUGH, E., Mind and Medium in Art. IV. *Brit. J. of Psychol.*, 1920, **11**, 26-46.

It is important to distinguish between Art in its static and Art in its dynamic aspect; the former as art objects, the latter from the point of view of the creative artist or actively appreciating recipient. In the first, of course, the medium exerts some influence. In the second, as well, though here the artist holds two attitudes

toward medium, as for example, the literary artist will gloat over the sonorousness and rhythm of a word, but will, when the occasion arises, treat it as part of a completed whole with apparent indifference, and will ruthlessly discard it from an unwanted place.

The connecting link between medium and the vision of the artists is Technique. Technique consists in a knowledge of the medium and of its behavior plus manual dexterity, plus 'technical memory.' These work together by means of "*images de traduction*"—visual-motor schemes, left by study, in the mind of the painter—active symbols which serve as general pictorial ideas.

H. D. KITSON (Indiana)

464. VALENTINE, C. W., Mind and Medium in Art. V. *Brit. J. of Psychol.*, 1920, **11**, 47-54.

To summarize the conclusions of the symposium of which this is the last portion: The appropriate use of materials is one element that goes to make up a work of art, though this cannot be used as the sole criterion. The perception of beauty is dependent upon the mind as well as upon the object; whether or not it exists *in its fullest degree* in the mind of the artist is open to question. More likely the artist has it fairly clearly, but even he makes it more clear by externalizing it in material form. At any rate he probably has greater esthetic enjoyment of it after he has externalized it. There should be included as important factors the direct appeal to the feelings of sensory elements in the observer, especially in music and the visual arts, also something like "the receptive contemplation of a philosophical idea, a 'simple apprehension' (in Stout's sense) as applied to an idea instead of to a material object."

H. D. KITSON (Indiana)

## 8. SPECIAL MENTAL CONDITIONS

465. WELLS, W. R., Sublimation of Non-Sexual Instincts. *Ped. Sem.*, 1921, **28**, 73-77.

The Freudian theory of sublimation is applicable not only to sex but to all instincts. Some ways are suggested in which pugnacity, self-assertion, fear, curiosity, and feeding undergo this process in everyday life.

J. F. DASHIELL (North Carolina)

466. SALTER, W. H., A Further Report on Sitzings with Mrs. Leonard. *Proc. Soc. Psychical Res.*, 1921, 32, 2-144.

Long detailed reports of sittings with Mrs. Leonard.

M. C. BROOKE (Pennsylvania)

467. THURSTON, H., The Phenomena of Stigmatization. *Proc. Soc. Psychical Res.*, 1921, 32, 179-208.

The term "stigmata" as used in this discussion is spoken of in its hagiological not in the medical sense. The author states that the Society has always been interested in, not only problems of telepathy and communication, but also the internal workings of the human organisms, especially the influence exercised by the mind upon the body and its psychical processes. Among the remarkable phenomena of the latter class is stigmatization. Throughout the entire discussion, in speaking of stigmata, the writer refers to those physical counterparts of the wound marks of Christ which manifested themselves outwardly.

Out of some sixty cases of complete or partial stigmatization, the first illustration is taken of a young girl who at an early age became an invalid and after years of acute suffering appeared to be miraculously cured. Following this she had several visions in which she claims to have come face to face with the Almighty beginning a series of phenomena occurring weekly, at which times blood flowed freely from wounds corresponding in position and size with those of the Crucifix. The most remarkable part of this circumstance is the fact that the wounds disappeared following the phenomenon. Several other illustrations are given of cases experiencing similar unusual occurrences of stigmatization.

Cases are extremely rare where blood has been produced through the skin by hypnotic suggestion and they have been of the most trivial character. The writer says "On a review of the facts as a whole so far as we have been able to consider them in this necessarily very rapid survey, it may be admitted that, although the phenomena of stigmatization do seem to postulate an astoundingly wide range for the influence of mind over the body, there is so far nothing which necessitates our having recourse to a supernatural explanation."

The question of stigmata might be said to be produced by auto-suggestion were it not for sworn statements by reputable physicians that post-mortem examinations of several stigmatized persons revealed unmistakable traces of lesions. Evidence may be regarded

as unsatisfactory but further investigation is surely needed. Sir Oliver Lodge says "it may be found that a few of the things now, and on the whole wisely, relegated to the ashpit of superstition, will have to be disinterred and reconsidered."

M. C. BROOKE (Pennsylvania)

468. ALRUTZ, S., Problems of Hypnotism: An Experimental Investigation. *Proc. Soc. Psychical Res.*, 1921, 32, 151-179.

The author in an introductory note reviews the beliefs and views of the pioneer hypnotists—Mesmer, Braid and Charcot. He explains how complete insensibility of the skin—analgesia and anesthesia—is obtained over certain portions of the body while other parts do not change their over-sensitiveness, making any number of experiments possible. Reports of sittings are given with the subject in light and deep hypnosis. Irradiation is obtained by inhibiting or decreasing functions over a larger area. This increase or decrease of function is proportionate to the dynamogenic increase on the other. Changing from downward to upward passes varies the hypersensitiveness of the subject. To illustrate this point interesting experiments are given for the fields of smell, pain and thermal sensations.

In experiments involving sight the author finds a strong increase of vision far above normal on the extra sensitive side; also a lengthening of the spectrum and increased sensitiveness value for light and color. These increases in visual hyperesthesia are found to be proportionate to the degree of hypersensibility of the skin on the same side and accompanied by a corresponding decrease of function on the other side. Various figures and charts are given to prove and clarify these statements and experiments. Sittings are reproduced to illustrate how the neuro-muscular system can be effected. Interesting reactions are displayed on the motor nerve and sinews in which cases the author states that autosuggestion cannot be excluded and, on the contrary, may easily enter into play.

Charcot detected increased mechanical sensitiveness under certain hypnotic conditions and called it neuro-muscular hyper-excitability existing only in the lethargic hypnotic state. Under these same conditions he found the tendon reflexes increased.

The author discusses briefly the effect of the eye or gaze, likewise of thought on the subject and, in the latter, brings out some interesting facts concerning the effects of telepathy during hypnosis. He sums up his conclusions and theories under nine condensed



headings in which he asserts that a nervous influence exists in the human body which can be affected under certain conditions producing light or deep hypnosis according to the nature of the stimulus brought to bear on the subject. Alrutz claims that science is not at present progressing in any marked degree; the problems of the connection between mind and body and consequently science should accept the opportunity offered by psychical research.

M. C. BROOKE (Pennsylvania)

469. CHENEY, C. O., The Significance of Spiritualism. *Ment. Hyg.*, 1921, 5, 529-535.

Here the author explains the belief in spiritualism and immortality in terms of the much discussed "wish-to-believe" and specifically cites the instances of Hyslop, Lodge, and Wm. James. While it would not be advisable to advocate the curtailment of belief in immortality he suggests that belief in spiritism should be redirected. Such latter beliefs absorb the individual, cut him off from interest in others, make him unproductive and a burden.

R. H. WHEELER (Oregon)

470. OERTEL, H., Psychic Epidemics. *Canadian J. of Ment. Hygiene*, 1921, 3, 1-10.

In one form or another, and at one time or another, there have been outbreaks of psychic epidemics in different parts of the world. The ground for their development is always prepared by great exhausting upheavals (famine, war, plagues, etc.) which unbalance the human mentality, paralyze restraint and judgment, and throw, therefore, the savage animal, imitating nature and common instincts of man, into most extraordinary relief. These psychic epidemics depend all upon a morbid enthusiasm of one thing or another, often augmented by hatred, leagued with baser passions, but frequently cloaked in, and supported by, a mantle of virtue. Their desire is to satiate long-suppressed emotions, jealousy, revenge, and sensuous pleasures which are ordinarily suppressed by conventions. In this article, several instances of psychic epidemics, as they arose at different times, in different parts of the world, are cited and described.

M. E. GALLAGHER (Pennsylvania)

## 9. NERVOUS AND MENTAL DISEASES

471. FURBUSH, E. M., Social Facts Relative to Patients with Mental Diseases. *Ment. Hyg.*, 1921, 5, 587-611.

This is a statistical study showing the number of native and foreign born in 46 state hospitals, the rate per 100,000 by states, the distribution of foreign born by countries, citizenship by states, marital condition of first admissions, per cent. coming from urban and rural environments, the economic status of admissions, age distribution, use of alcohol, and the like. Merely the facts are presented, with little interpretation.

R. H. WHEELER (Oregon)

472. MAY, J. V., Laws Controlling Commitments to State Hospitals for Mental Diseases. *Ment. Hyg.*, 1921, 5, 536-544.

This article briefly discusses the history of the legal status of insanity and mental deficiency; it describes the commitment laws of various states in the union and the temporary-care enactments which are in force in certain localities such as Boston and New York City.

R. H. WHEELER (Oregon)

473. BARRETT, A. M., The State Psychopathic Hospital. *Ment. Hyg.*, 1921, 5, 545-555.

The work of the state psychopathic hospital is such that it warrants far more interest and a much wider adoption than exist at present. The chief aims of such an institution are observation, treatment, research and teaching. Its work may be divided into various phases as follows: (1) observation of commitment from probate courts, circuit courts, and through the courts, commitments from public schools and social welfare organizations; (2) social service work involving after care, work in outpatient organizations, and making family observations; (3) its work should be coördinated with University and State Hospital control; (4) it should coöperate with state hospitals for the insane, with homes for defectives and with scientific work done in various state homes and hospitals. (5) It should handle the voluntary admissions from the state at large. Its position enables it to be a leader in the mental hygiene work of the state.

R. H. WHEELER (Oregon)

474. MOTT, F., Second Maudsley Lecture. *J. of Ment. Sci.*, 1921, 67, 319-337.

The article is divided into two parts. The first deals with the history of Maudsley Hospital, its inception, aims and uses. The second is an account of the author's researches concerning dementia præcox.

In the second part he compares the mental and bodily changes of general paralysis of the insane, an acquired disease, with the mental and bodily symptoms of dementia præcox, an inborn germinal disease.

He concludes the account of his researches by stating that considerable pathological evidence is forthcoming to show that dementia præcox is the result of an inborn germinal deficiency of productive energy of the reproductive organs associated with a progressive deterioration of psycho-physical energy, the morbid manifestations of which show themselves in the whole body, but especially in the brain, particularly and firstly in its highest evolutionary level.

R. E. LEAMING (Pennsylvania)

475. MOTT, F., The Psychopathology of Puberty and Adolescence. *J. of Ment. Sci.*, 1921, 67, 280-318.

This is a detailed account of the author's investigations of morphological, biochemical, histological and metabolic changes in dementia præcox.

R. E. LEAMING (Pennsylvania)

476. CLARKE, C. K., A Study of 5,600 Cases Passing Through the Psychiatric Clinic of the Toronto General Hospital. A Special Study of 188 Clinic Cases—Also a Survey of 767 Cases of Illegitimacy. *Canadian J. of Ment. Hygiene*, 1921, 3, 11-24.

This article deals with the results of the consideration of 5,600 carefully classified cases that have passed through the Psychiatric Clinic of the Toronto General Hospital. There is a special study of 188 clinic cases—also a survey of 767 cases of illegitimacy. Results are obtained under the headings: Prostitution, Nationality, Illegitimacy, Occupation, and Occupational Wanderers. Appended are the figures in connection with the survey. The statistics will prove helpful as a nucleus, and will, no doubt, inspire true social

reformers to greater efforts in the matter of the prevention of the evils stated.

M. E. GALLAGHER (Pennsylvania)

477. BARAGAR, C. A., Prevention of Mental Breakdown. *Canadian J. of Ment. Hygiene*, 1921, 3, 55-64.

The prevention of mental breakdown, so far as our present knowledge and control permits, is to be attained by active steps in four main directions: (1) Medical and Social. By the adequate prevention and treatment of alcoholism and syphilis. (2) Heredity. By steps to prevent the bringing into the world of individuals likely to have a mental breakdown. This may be attained to some extent by contraceptive measures, and possibly, in certain cases, by sterilization, but chiefly by building up high social ideals and a strong enlightened public opinion, and by emphasizing the true object of matrimony. (3) Development. Ensure for each child a healthy body. Develop in each individual healthy habits of thought and objective interests, taking care that more youthful or inefficient modes of adjustment do not become fixed. Balance properly the child's physical and mental activities. Face frankly and take steps to counteract abnormal tendencies in the child. (4) Immigration. Wise and well-enforced immigration laws are required.

M. E. GALLAGHER (Pennsylvania)

478. GRAIN, G. O., Our Attitude Towards the Mentally Diseased. *Canadian J. of Ment. Hygiene*, 1921, 3, 71-75.

The trend of public opinion is towards greater consideration of the feelings of the insane patient, and less stringency in the interference with his individual rights. This more favorable attitude towards the mentally diseased has been brought about by a wider knowledge as to the nature of the underlying causes. The attitude of hopelessness towards mental disease in the past has served to rob many a curable case of his right to treatment and it still operates, along with delay in diagnosis and faulty methods in treatment, against the chances of cure in numerous cases. The care of cases of mental disease is a trying occupation and one that exacts the utmost vigilance, unflagging energy, presence of mind, intelligence, and in fact, all those qualities which we associate with a good nurse.

M. E. GALLAGHER (Pennsylvania)



## 10. INDIVIDUAL, RACIAL AND SOCIAL PSYCHOLOGY

479. POFFENBERGER, A. T., Motion Pictures and Crime. *Sci. Mon.*, 1921, 12, 336-339.

The motion picture shows portraying the commission of crimes may be a menace because of the suggestibility of the mentally retarded and of the children. The remedy should come from within, not from without.

J. F. DASHIELL (North Carolina)

480. CARMICHAEL, R. D., On the Character of Primitive Human Progress. *Sci. Mon.*, 1921, 12, 53-61.

J. F. DASHIELL (North Carolina)

481. CURTIS, H. S., Education in Matters of Sex. *Ped. Sem.*, 1921, 28, 40-51.

Sex education should consist of four parts: acquiring of information; development of proper attitude; strengthening of the will; development of ideals of love and marriage. Many suggestions are made as to instruction on matters of sex at home, in different grades and kinds of schools, and through various agencies such as parents, physicians, literature, moving pictures, exhibits, etc.

J. F. DASHIELL (North Carolina)

482. CAMPBELL, C. M., Mental Hygiene in Industry. *Ment. Hyg.*, 1921, 5, 468-478.

A general and rather unsystematic discussion of the field in its medical, economic and social aspects. The problems here involved are very complex. One must take into consideration the personality of the worker, the conditions under which he works, his domestic and social life, etc. Further, one must take into consideration the intelligence of the worker in order that in his life outside of work hours he is capable of utilizing the means of satisfaction available in the environment. Unless the individual is trained to use concerts, libraries, galleries, etc., they are non-existent for him. The field is a rich one for research.

R. H. WHEELER (Oregon)

483. RICHARDS, E. L., The Rôle of Situation in Psycho-pathological Conditions. *Ment. Hyg.*, 1921, 5, 449-467.

Here are discussed in detail the cases of several maladjusted

children, all practically normal in intelligence but who had developed psycho-pathological traits owing to unsatisfactory environment. In each case the "situation" in which the child was living was investigated, and was corrected as far as was possible with the result of improvement throughout. These cases are excellent examples of the need for more scientific methods in psychiatric work and less unconscious determination on the part of the physician to find an exposition of some preconceived theory and to treat accordingly.

R. H. WHEELER (Oregon)

484. FISHER, B., Has Mental Hygiene a Practical Use in Industry? *Ment. Hyg.*, 1921, 5, 479-496.

This is an article by an employment manager who describes the advantages and dangers of mental hygiene in industry from the point of view of the industry itself. While he is sympathetic toward the efforts of psychiatry to make itself useful in industry he points out among other things three important considerations: (1) The average physician is incapable of handling the problems of mental hygiene in industry without special training in psychiatry and in the practical problems of the industry itself; (2) the methods and practices of psychiatry in industrial plants must be very safely guarded against instilling distrust in the minds of the workers; (3) emphasis upon conditions of mental health suggests a new philosophy of life and a new attitude toward social discipline and control, hence must be introduced gradually and cautiously. He further points out that industry has for some time implicitly recognized mental levels in payment according to output, in the idea of "job specifications" and in selecting suitable types of work for the mentally deficient. He cites the example of Colonel Brice Disque's work with the lumbermen of the Northwest during the war as an illustration of what mental hygiene can do for industry where the need is urgent.

R. H. WHEELER (Oregon)

485. KENWORTHY, M. E., The Mental Hygiene Aspects of Illegitimacy. *Ment. Hyg.*, 1921, 5, 499-508.

Leaving out of consideration the group of girls who are mentally pathological and sexually promiscuous the author finds the following groups of girls whose sexual promiscuity is motivated in various typical fashions. (1) There are girls who on account of unpleasant

family relations develop a grudge attitude or a feeling of inferiority. Their sexual life becomes an attempt to compensate for these mal-adjustments or for a possible sexual inferiority. Also a certain number are seduced by fathers or adult male relatives in which case promiscuity may become a substitutive process or an unconscious protest. (2) There is a group in which feeble-mindedness is found with illegitimacy. Here, perhaps, there is a normal sexual desire with lack of intelligent inhibition. (3) There is a group of higher-grade defectives who perhaps endow their sexual life with added significance. Here an attractive physical make-up and narrow interests function as causal agents. (4) The epileptic finds that attempts at adaptation along socially accepted channels fail and she, too, finds compensation in sex indulgence. (5) There seems to be a group which deliberately accepts its sex attributes as a forceful means of putting itself across in the community. In treating these problems one should find the motive behind the act by means of careful personality studies.

R. H. WHEELER (Oregon)

486. JARRETT, M. C., The Educational Value of Psychiatric Social Work. *Ment. Hyg.*, 1921, 5, 509-518.

A paper general in nature dealing with the divisions of labor in the field of social work and the duties of the personnel worker.

R. H. WHEELER (Oregon)

487. SINGER, H. D., Mental Health Clinics. *Ment. Hyg.*, 1921, 5, 519-528.

This is another article dealing with material which has been covered before in these reviews, namely, the importance of the health clinic, types of cases referred to it, methods of treatment and of giving advice. Of significance is the author's recognition that a functional-behavioristic point of view is essential for an adequate conception of mind and of mental health problems.

R. H. WHEELER (Oregon)

488. POLLOCK, H. M., Records and Statistics in Occupational Therapy. *Ment. Hyg.*, 1921, 5, 566-573.

This paper contains suggestions for a system of records to be used in occupational therapy in state hospitals or allied institutions. Emphasis is laid upon the point that state hospitals are becoming

schools more and more as well as functioning as hospitals and homes.

R. H. WHEELER (Oregon)

489. ABBOT, E. S., Outline for a State Society of Mental Hygiene. *Ment. Hyg.*, 1921, 5, 574-586.

Here are suggested in detail the kinds of work appropriate for a State Society of Mental Hygiene. The paper also presents the objects, scope, functions and methods of the Mental Hygiene Committee of the Public Charities Association of Pennsylvania. This outline contains valuable suggestions for those who are interested in formulating the duties and divisions of labor of such committees.

R. H. WHEELER (Oregon)

490. SWIFT, E. L., Sensible Aid for the Blind at Chicago Lighthouse. *Nation's Health*, 1921, 3, 470-471.

Chicago was among the first cities in this country to recognize the right of normal blind people to a vocational training which would enable them to be self-supporting members of the community. The Chicago Lighthouse has trained blind people to be self-supporting in the following operations in factories: assembling, wrapping, sorting, stacking, folding, mechanical operations, piano tuning, chair caning, fiber furniture weaving. The blind also have been taught to excel as basket weavers, baby carriage weavers, textile weavers, typists, dictaphone operators, and stenographers. Graduate students have earned \$30,000 in the past year at these occupations.

M. E. GALLAGHER (Pennsylvania)

491. HORWITZ, A. E., Educational Needs of the Crippled Child. *Nation's Health*, 1921, 3, 472-475.

The plea of the author is: (1) To establish hospital schools for all crippled children needing physical care. (2) To establish special schools for all convalescent and ambulatory patients. (3) To establish work shops for those able to take advantage of them. (4) All these to be established under public supervision.

In this way, the mental handicap will not augment the physical defect, which is the case if orthopedic hospitals are not also educational.

M. E. GALLAGHER (Pennsylvania)



492. TAIT, W. D., Democracy and Mental Hygiene. *Canadian J. of Ment. Hygiene*, 1921, 3, 31-36.

We need leaders and leadership, but we are defeating our own purpose by preventing the exercise of those natural laws which eliminate the unfit. Protection and repression for the sake of protection will never lead to the realization of a healthy and progressive civilization. We must rid ourselves of the weak, else we perish with them; we must save the race, not the individual, and we can only save the race by cultivating the superior type. The individual must be given the opportunity of looking after himself, of saving his own soul because no one else can do it. Some will fall by the wayside, but those who have passed through the fire will be able to lead us forward towards the goal of true democracy.

M. E. GALLAGHER (Pennsylvania)

493. CORNELL, W. B., The Organization of State Institutions for Feeble-minded in the United States. *Canadian J. of Ment. Hygiene*, 1921, 3, 65-70.

This paper is a presentation based on a questionnaire circulated in 1919. The results are summarized into "fourteen points," based on the questionnaire survey.

M. E. GALLAGHER (Pennsylvania)

## II. MENTAL DEVELOPMENT IN MAN

494. PETERSON, J., The Growth of Intelligence and the Intelligence Quotient. *J. of Educ. Psychol.*, 1921, 12, 148-154.

This is a discussion of an article by Freeman which appeared in the January issue of this journal (pages 3-13) and in which he questioned certain views about the characteristics of intelligence growth, especially that the rate of intelligence growth decreases with age. Peterson presents figures and curves to show that growth may appear to be uniform or to decrease with age according to whether the records are presented in terms of average amount done per unit of time or time required to do a unit of work. Whether the data should be presented the one way or the other is open to debate, but Peterson recommends caution in ascribing any particular shape to the intelligence growth curve, and still more caution in drawing inferences from such curves.

In the same issue of the journal (pages 155-158) Prof. Freeman replies to the comments of Prof. Peterson, stating that his arguments are based on the units of measure which are actually used in applying the test scales, namely, points scored, and not on "the units which might have been used."

A. T. POFFENBERGER (Columbia)

495. MUDGE, E. L., Time and Accuracy as Related to Mental Tests. *J. of Educ. Psychol.*, 1921, 12, 159-161.

This study grew out of certain discrepancies between mental test scores (Thurstone and Otis) and academic standing, which suggested that certain important factors were left out of account in the tests. Assuming that one important factor might be accuracy, which seems to be subordinated to speed in the tests, the author prepared some accuracy tests involving various mental functions and tried them out on two Normal School groups. From a comparison of the performance of the students in the speed tests (Otis and Thurstone) and the accuracy tests, the following conclusions were reached: (1) The brightest students tend also to be the most accurate, and the dullest tend to be the most inaccurate. (2) Aside from these extremes the brighter students seem to be more inaccurate than the duller students. (3) Certain individuals, who do poorly under a time limit, do well when allowed to work more slowly. Since accuracy is a very highly desirable quality in everyday life the author suggests that more attention should be paid to it in educational programs.

A. T. POFFENBERGER (Columbia)

496. THORNDIKE, E. L., The Psychology of Drill in Arithmetic: The Amount of Practice. *J. of Educ. Psychol.*, 1921, 12, 183-194.

When arithmetical abilities have been analyzed into the formation and use of specific bonds (see an article in this journal, 1921, 12, 14-24) the question naturally arises as to how much drill is necessary to establish the necessary bonds. Prof. Thorndike makes some startling disclosures concerning the amount of drill provided in textbooks for the four operations with simple integers. Why should 2 plus 2 be drilled four times as much as 8 plus 8, or forty times as much as 2 divided by 2? Just as startling are the errors that teachers make in estimating the amount of drill that textbooks provide. It seems as though neither the author of the textbook

nor the teacher who uses it really knows what the book contains. There is evident a great overdrilling of easy combinations and an underdrilling of difficult combinations. Prof. Thorndike makes some estimations of the amount of drill that is necessary for establishing certain simple bonds, but recognizes that there are a great many conditioning factors to be reckoned with. Aside from such factors as intelligence of the pupil, his interest, the difficulty of the combination, the matter is further complicated by the fact that a certain amount of overlearning is justified in at least three types of cases, specified by the author. But underlearning is never justified. The paper closes with eight facts of primary importance growing out of the discussion. These should be carefully studied by anyone interested in the teaching of arithmetic.

A. T. POFFENBERGER (Columbia)

497. BUSWELL, G. T., The Relationship between Eye-Perception and Voice Response in Reading. *J. of Educ. Psychol.*, 1921, 12, 217-227.

This is a brief summary of a monograph published by the author in 1920 (*Supplementary Educ. Mono.* No. 17). Studies were made of the relationship between eye and voice in reading by means of photographic records of eye movements which were synchronized with dictaphone records of the voice. Good readers were found to differ from poor ones in length of eye-voice span, the eye keeping farther ahead of the voice in good readers; in length of the fixation pauses, the pauses being shorter in good readers; in number of fixations per line of print, the better readers having fewer fixations; and finally in relative length of eye-voice span in different parts of the sentence, the poor readers having a rather uniform and shorter span throughout the sentence, and the good readers having a long span at the beginning and a short span at the end of a sentence.

The eye-voice span was found to be quite flexible and dependent on the character of the matter read, much more than on the mechanical arrangement of the printed matter. The knowledge of these differences between good and poor readers should be of great service in determining methods of instruction in reading.

A. T. POFFENBERGER (Columbia)

498. MYERS, G. C., Prophecy of Learning Progress by Beta. *J. of Educ. Psychol.*, 1921, 12, 228-231.

In a study of 1,400 illiterates in the army Myers found the relation between the score in Beta (Army test for illiterates) and

the time required to complete a prescribed course of six grades in the Recruit Educational Center at Camp Upton. The figures show clearly that those rating highest in Beta tend to progress much faster than those rating lowest. Myers states that the prognostic value of the test would be much more evident if it were not for certain disturbing factors. Prominent among these factors is the poor showing made by foreigners in the Beta test through lack of a knowledge of English—"for even Beta handicaps the non-English speaking men."

A. T. POFFENBERGER (Columbia)

499. FREEMAN, F. N., The Scientific Evidence on the Handwriting Movement. *J. of Educ. Psychol.*, 1921, 12, 253-270.

Freeman questions the dogma of the arm movement by which the whole field of handwriting is dominated. He considers this arm movement dogma to be refuted by the fact that few pupils acquire it, in spite of teaching, and still fewer use it habitually.

Handwriting movements of good and poor writers are analyzed by means of motion picture study, very much as movements in industrial operations have been analyzed by Gilbreth and others, in order to discover the essentials of good writing movements. The writing position and the composition of the writing movement, especially in regard to speed, have been analyzed. The essentials of position are not those of the arm movement method. Certain matters of position, such as position of wrist, angle of forearm in relation to the line of writing, the support of the hand, the relation of thumb and forefinger in holding the pen, have some relation to excellence in writing. Certain conclusions in regard to speed are listed, e.g., that in good writing a retardation of speed or a pause is necessary where there is a radical change in direction of movement, the speed of the stroke should be adapted to its length (the longer the stroke the greater the speed), and the speed should be greater in the middle of the stroke than at the beginning or the end. There is some evidence from a training experiment that these good traits can be taught to elementary school students so as to greatly improve their writing.

A. T. POFFENBERGER (Columbia)

500. A Symposium: Intelligence and Its Measurement. *J. of Educ. Psychol.*, 1921, 12, 123-147; 195-216, and 271-275.

This symposium consists of a group of responses by fourteen psychologists to three questions put by the editors of the Journal of



Educational Psychology: (1) What is intelligence? (2) How can it best be measured by group tests? (3) What are the most crucial next steps in research?

This series of opinions cannot be adequately reviewed in a short space, and the reviewer simply wishes to call attention to it. There is very great disagreement concerning the concept of intelligence, but rather striking agreement as to the methods of measurement. In suggesting methods there is a marked tendency to keep in mind practical needs instead of theoretical definitions. As to the next steps to be taken, perhaps the most prominent place is given to the need for measures of character traits, which, except in one or two cases, are not included in the definition of intelligence. The need for non-language tests, for tests for adults, for better test norms, and for tests for specific capacities is clearly indicated. For those seeking research problems, the answers to the third question offer a wealth of good material.

A. T. POFFENBERGER (Columbia)

501. GATES, A. I., The True-False Test as a Measure of Achievement in College Courses. *J. of Educ. Psychol.*, 1921, 12, 276-287.

Gates makes a comparison of the True-False test, such as is frequently used in general intelligence examinations, with the more customary types of school examinations, essays, quizzes and other written work. As a criterion upon which to judge the relative value of these methods he uses a composite score made from the sum of essay examinations (weight 1.0), the sum of the True-False examinations (weight 1.0), the sum of written work (weight 0.5) and the sum of quizzes, etc. (weight 0.5). The most important comparisons are made between True-False and essays, and each of these with the criterion.

In every case the True-False test seems to be superior as suggested by the following points: (1) Correlation of True-False test with criterion .65; of essay with criterion .56. (2) Correlation of True-False test with intelligence examination .41; of essay with intelligence examination .34. (3) Combining several True-False tests raises the correlation with the criterion and with the intelligence test, which is not true of the essay examinations. (4) The True-False test saves an enormous amount of time in giving and scoring the test, covers a wider range of material, permits the development of standards of achievement, etc.

A. T. POFFENBERGER (Columbia)

502. FERGUSON, G. O., Mental Status of the American Negro. *Sci. Mon.*, 1921, 12, 533-543.

The article is a summary of information on the problem, including:—Differences between negro and white are not in sensory and motor but in the higher functions. Various tests in schools show the percentage of negroes equalling the average of whites to be for elementary grades 20 to 25, for high school 30 to 35. The army tests for literates showed only 5 to 10 per cent. of the colored troops reaching the white average; for illiterates 10 to 15 per cent.; by the Stanford Revision 20 to 25 per cent.

J. F. DASHIELL (North Carolina)

503. FREEMAN, F. N., Bearing of the Results of Mental Tests on the Mental Development of the Child. *Sci. Mon.*, 1921, 12, 558-576.

Current conceptions of child psychology still rest largely on the data gathered before the present era of mental testing, and have been too little criticized in terms of the latter. In this article such a critique is made of our traditional conceptions of mental growth.

A survey of tests of particular mental functions and tests in school subjects brings to light different forms of progress in tests that superficially seem nearly identical. It is important that many of them tend to show a slower rate of progress with later ages, yet with different tests different times of maturing appear. Thus, so far as concerns narrowly defined capacities, fairly definite stages of development are discernible, and give rise to the practical problem of when the training of such capacities should be attempted.

Progress curves for more composite functions tend to assume the straight line rather than the progressive retardation form found for the specific functions. It thus follows that representation of development of intelligence by a curve with negative acceleration is not as adequate as by a curve in straight line form.

The progress curves for individuals of different original abilities vary little in their general form, the breaks occurring at much the same ages, and the great difference being a difference in absolute level of ability throughout.

The traditional theory that crises or stages in mental growth correspond to particular transitions or stages of physical growth is discredited by the tendency of intelligence test curves to show uniform rates of change. The demand for definite divisions in the school system is, then, not to be made on this basis.

J. F. DASHIELL (North Carolina)

504. NICE, M. M., A Child and Nature. *Ped. Sem.*, 1921, 28, 22-39.

Records of remarks, observations, and behavior of a child showing unusually intense interest in and love of nature.

J. F. DASHIELL (North Carolina)

505. OATMAN, M. E., A Boy's Development at Eighteen Months. *Ped. Sem.*, 1921, 28, 52-59.

Description of the development of a boy, especially as to his language development and as to his socializing tendencies. His vocabulary of over 100 words is classified according to interests.

J. F. DASHIELL (North Carolina)

506. MUDGE, E. L., An Adolescent Genius. *Ped. Sem.*, 1921, 28, 78-82.

Biographical notes on Marie Bashkirtseff.

J. F. DASHIELL (North Carolina)

507. CURTIS, H. S., Children's Fears. *Ped. Sem.*, 1921, 28, 139-146.

A non-technical analysis of childhood fears and some of their causes.

J. F. DASHIELL (North Carolina)

508. GEBHART, J. C., Defective Nutrition and Physical Retardation. *Ped. Sem.*, 1921, 28, 147-155.

The Holt-Burk-Boas figures for height-weight standards are recommended as preferable to others. Some statistical cautions in applying such norms are urged. A distinction is made between defective nutrition, which is improveable in a short time, and physical retardation, which responds more slowly. Boas's table of physiological maturity, age, and normal variability is presented.

J. F. DASHIELL (North Carolina)

509. MYERS, G. C., Intelligence Classification and Mental Hygiene. *Ped. Sem.*, 1921, 28, 156-160.

It is predicted that intelligence surveys will be made of whole cities. The determination of the intelligence of individuals will have important bearing upon work of the court, relief work, industrial and business organizations, the marriage bureau, and the school curriculum and organization.

J. F. DASHIELL (North Carolina)

510. TOMPKINS, E., Stammering Studies. *Ped. Sem.*, 1921, 28, 161-170.

An appreciation of Fletcher's experimental study in 1914 in favorable comparison with theories since developed.

J. F. DASHIELL (North Carolina)

511. ANDERSON, L. D., Estimating Intelligence by Means of Printed Photographs. *J. of Applied Psychol.*, 1921, 5, 152-155.

The purpose of the investigation was to determine the reliability of photographs for indicating the intelligence of strangers, and to seek out differences in the ability of various persons to judge intelligence by this means.

Sixty-nine persons were given an adaptation of the army intelligence test. Photographs of these persons who were buyers, managers, etc., in a department store company were printed in the company annual. Twelve judges were selected from students and instructors of psychology and asked to estimate the intelligence of the people by a careful study of their photographs. The photographs were placed in four groups—the seven most intelligent, the seven least intelligent, the fourteen who were superior but not as good as the best seven, the fourteen who were inferior but not as poor as the worst seven.

It seems doubtful that intelligence can be gauged by a study of a man's photograph. There was a correlation of .27 between assigned ratings and intelligence measured by the tests. There are considerable individual differences shown in ability to make ratings on intelligence from photographs.

E. MULHALL ACHILLES

512. ROOT, W. T., Two Cases Showing Marked Change in I.Q. *J. of Applied Psychol.*, 1921, 5, 156-158.

Two cases are given as typical ones where the I.Q. changed. In one case the case was 9 years, mental age 8-4; and upon second examination 9-4 and 9-9 years. Thus the I.Q. was 92 and later 104. The second case was 6-8, mental age 7-6 with an I.Q. of 112 and the second examination when the child was 6-11 showed a mental age of 9-8 or I.Q. 140.

E. MULHALL ACHILLES

513. ESTABROOK, A. H., The Biological Bearing of Army Mental Tests. *Social Hyg.*, 1921, 7, 279-284.

The first complete national health survey of any large group



carried on in this country was the physical and mental examination of the men drafted for military service during the world war. These examinations comprised only the males between the age of 21 and 31 inclusive. All men within the drafted age were examined by the medical officers of the local draft boards in their home communities before being sent to the army camp. Thus the more pronounced cases of physical and mental defects were eliminated at once, and never reached the army cantonments. On the mental side, these included the idiots, some of the imbeciles, the well-recognized cases of insanity, and the known epileptics. The other mental cases, such as the higher grade of the feeble minded and various forms of nervous and mental unfitness, were often not discovered until an examination was made by neuro-psychiatric and psychological boards at the cantonments.

The work of the Division of Neuro-Psychiatry in brief showed the following results: that the army returned to the civil community about 70,000 men unfit for any military duty because of mental defects. These men were classified under eight headings: mental defect, neuroses or functional nervous disorders, psychoses or mental disease, organic nervous disease, epilepsy, constitutional psychopathic states, glandular disorders affecting growth, and inebriety (alcohol or drugs).

The Division of Psychology was responsible in great part for the discovery, examination, and certification of the group of mental defectives. Actual discharge of these cases was effected by the psychological boards. The Division of Psychology also made other investigations and studies which have significance of eugenical nature.

To the army the chief value of the psychological work lay in its ability to aid in the production of an efficient war organization. Its activities dealt largely with cacogenic persons, with less emphasis on the positive side of eugenics. However, the Division of Psychology at Washington has in its files a mental rating of one and a half million persons. It has lists of all the mentally defective and abnormal found, with more or less of the personal history attached. Thus, as a starting point, great eugenical studies could be made, and many valuable histories worked out. Finally, the cross-section of the mental and physical make-up of the population started in the great emergency by the army might be made the basis for a complete mental, physical, and social study of the entire population of the United States.

M. E. GALLAGHER (Pennsylvania)

514. Ketner, S. P., Grouping by Standardized Tests for Instructional Purposes. *J. of Educ. Research*, 1920, 2, 620-625.

A plea is made for the application of scientific tests to determine the attainments and aptitudes of groups of pupils in order to "apply remedies which will bring each group up to standard in the point in which it is weak." A demonstration of the possibilities of such measurement is given by a citation of the results obtained in silent reading with the fourth, fifth and sixth grades in one of the Denver schools. It is planned to use a record booklet for each child in which would be stated the results of standardized tests given at different times in the educational career of a pupil.

S. C. KOHS (Reed College)

515. CAPPS, A. G., Curriculum Content of a High-School Spelling Course. *J. of Educ. Research*, 1920, 2, 626-635.

This is a study based upon the spelling efficiency of 120 pupils in a small high-school town of Missouri. The questions discussed include: (1) The technique of using the frequency of error method for determining the spelling curriculum; (2) The standards of efficiency which high-school students attain; (3) Is society demanding too high standards? (4) What words do pupils misspell, together with the frequency of error; (5) Comparison of this list of misspelled words with Ayres list of 1,000 words most commonly used. The results showed that the more advanced the class the higher its spelling efficiency. The median number of errors per page was 0.51, or one mistake in spelling on every two pages, or one error for every 300 written words. The demands of society for perfection in spelling were unreasonably high.

S. C. KOHS (Reed College)

516. CHAPMAN, J. C., and EBY, H. L., A Comparative Study, by Educational Measurements, of One-Room Rural-School Children and City-School Children. *J. of Educ. Research*, 1920, 2, 636-646.

This study attempts to determine by scientific method, whether equality of educational opportunity, in the broad sense of the term, exists for rural- as well as for city-school children.

The tests used were, cancellation (Woodworth-Wells), substitution (Whipple digit-symbol), addition (Thorndike), opposites (Woodworth-Wells), hard directions (Woodworth-Wells), spelling (Starch list), composition (Hillegas), handwriting (Thorndike),

information (authors' selection), arithmetic fundamentals (Courtis, Series A). The fact that this study was originally made in 1916 may explain the inclusion of some out-of-date experimental material.

The results indicated practical equality of performance in cancellation, substitution, opposites and spelling. Superiority of city-school children was observable in writing and information, and very great superiority in addition, composition and hard directions. Regarding variability the investigators found that rural-school children varied slightly more than city-school children, that both groups manifested greater variability in tests dependent on schooling, and that between the ages of 11 to 13 there is a great reduction in the variability of rural-school children not shown by the city group.

S. C. KOHS (Reed College)

517. SANDIFORD, P., Critical Survey of Intelligence Testing. *Canadian J. of Ment. Hygiene*, 1921, 3, 37-46.

Peter Sandiford's paper is a critical analysis of intelligence testing—a critical survey of intelligence tests and an exposition of some of the unsolved difficulties in connection with intelligence testing, under the headings: (1) The Nature of Intelligence, (2) What is an Intelligence Test?, (3) Standardization of Tests, (4) Methods of Expressing the Results of Measurements of Intelligence.

M. E. GALLAGHER (Pennsylvania)

## 12. MENTAL EVOLUTION

518. WHEELER, G. C., Phototropism of Land Snails. *J. of Comp. Psychol.*, 1921, 1, 149-154.

Are the eyes of land snails functional? *Helix aspersa* was placed on a glass plate with long axis of body perpendicular to rays from a small light aperture, and direction of its movement noted. Individual records of ten subjects on six different days showed eight to be negatively phototropic, one indifferent, and one too sluggish for results. The eyes were then amputated and the tests repeated, resulting in indifference to direction of light. Further, one eye was amputated and effects of light on the eyeless and on the opposite side observed. Finally, substitution of a steam pipe for the lamp demonstrated that the tropic reactions had not been to heat radiation. Thus in *Helix* the eye rather than the skin is functional in phototropism, probably not as image-forming but only as a direction sense.

J. F. DASHIELL (North Carolina)

519. COLEMAN, W. M., Psychological Significance of Bodily Rhythms. *J. of Comp. Psychol.*, 1921, 1, 213-220.

Hundreds of observations with a stop watch were made of various rhythmic activities of animals. With many different types (lynx, badger, ostrich, seal, tortoise, etc.) synchronous relations were found by counting: pulse rate and footsteps; pulse and respiration; respiration and footsteps; pulse and rubbing horn, chewing, pecking, etc. These for animals in states of apparent calm, ease, sleep, or with free-running emotional expression: conditions of excitement from pain, hunger, fear, etc., showed disturbances of rhythms and hence disturbances of accord between different rhythms. It appears from many observations of changes from one rate to another with changes in general emotional or motor attitude that the heart acts as a pacemaker to the other rhythmic functions. Attention to periodic stimuli, as the footsteps of passer-by or the beating of metronome, frequently brings bodily activities to the same rate. The postponement or acceleration of fatigue with synchronous or non-synchronous rates of different bodily functions is explained in terms of reinforcement or interference of nervous irradiations from the several motor centers.

J. F. DASHIELL (North Carolina)

520. GILMAN, E., A Dog's Diary. *J. of Comp. Psychol.*, 1921, 1, 309-315.

A description of the training of a cocker spaniel showing successes and failures in learning various tricks, as shaking hands when human being's arms are crossed behind back, playing 'dead dog,' obeying vocal commands, bringing articles named, etc.

J. F. DASHIELL (North Carolina)

521. BLAKESLEE, A. F., Types of Mutations and their Possible Significance in Evolution. *Amer. Nat.*, 1921, 55, 254-267.

From experiments on the jimson weed we have added evidence that mutations of genes are not the only possible sources of new species. Chromosomal duplications and related phenomena simulate gene mutations in their effects upon the individual plant. Tetraploidy, in fact, may as the author believes have been one of the principal methods in the evolution of plants. It is significant that new species developing in this manner stand slight chance of being swamped by hybridization with the species from which they sprung. While tetraploid plants are not known, with certainty, outside of



cultivation, their presence in wild nature would be very difficult to ascertain. Such an occurrence, however, would furnish the barrier between a new species and its parental form that Darwin tried to find. Further it would provide a reason for the dominance of even numbers in the counts of chromosome pairs. Other types of chromosome duplication aside from tetraploidy are known and may have played a part in evolution.

Evidence from plant life shows that mutations occur which are not transmitted through seeds. While there seems to be no preferred location for the origin of factorial mutations in flowering plants, such mutations are more readily transmitted if they occur in the gametes or in the embryo. But sudden genetic changes are not necessarily associated with sexual processes. From these considerations it is important to distinguish between mutations from genes and mutations from chromosomal aberrations.

R. H. WHEELER (Oregon)

522. LIPPINCOTT, W. A., Further Data on the Inheritance of Blue in Poultry. *Amer. Nat.*, 1921, 55, 289-327.

While this article contains relatively little subject-matter of special interest to the psychologist, it is here mentioned for its possible value in illustrating (1) how two 3 : 1 ratios of Mendelian traits may combine to give the ratio 1 : 2 : 1; (2) the inheritance behavior of allelomorphic factors; (3) the independence of various dominant traits in their hereditary behavior but dependence of certain of these traits upon others for the manifestation of the former.

R. H. WHEELER (Oregon)

523. CLAUSEN, R. E., and GOODSPEED, T. H., Inheritance in *Nicotiana Tabacum*. II. On the Existence of Genetically Distinct Red-flowering Varieties. *Amer. Nat.*, 1921, 55, 328-334.

Here is to be found an interesting example of the inheritance behavior of four color factors in the flowers of tobacco plants. The relations of these colors are complicated by certain phylogenetic relations, thus lending value to the work as a demonstration.

R. H. WHEELER (Oregon)

524. CASE, E. C., On an Endocranial Cast from a Reptile, *Desmotosuchus spurensis*, from the Upper Triassic of Western Texas. *J. of Comp. Neur.*, 1921, 33, 133-147.

In comparing the endocranial cavity of *Desmotosuchus spurensis* with three other primitive reptiles certain interesting common features were found: (1) the brain cavities were relatively long and narrow with small development of the cerebral hemispheres; (2) the optic lobes and tracts were too small to leave any distinct marks on the casts; (3) the brains were sharply elevated in the middle portion with large epiphysial or paraphysial processes; (4) there was a considerable degree of constancy in the places of origin of the cranial nerves; (5) the pituitary bodies were relatively very large in comparison with the size of the brain. It is interesting to note that one of the common features of senility of any phylum is gigantism. It seems plausible, therefore, that adverse conditions which induce extinction of a phylum are at least, in part, of a physiological character affecting the deep-seated organs of the nervous system first and through them, and only secondarily affecting the superficial and gross structures of the organism. Moreover excessive overgrowths of spines, horns, tusks, etc., in the senile stages of various phyla may have arisen in a similar fashion. And further, normal gigantism in certain species may be a fixed trait induced by pituitary action.

R. H. WHEELER (Oregon)

525. PING, CHI, On the Growth of the Largest Nerve Cells in the Superior Cervical Sympathetic Ganglion of the Albino Rat—from Birth to Maturity. *J. of Comp. Neur.*, 1921, 33, 281-311.

Interesting comparative data were here obtained on the growth of cells from "standard" strains of albinos and from "inbred" strains. In the inbred rats the largest cells in the ganglion ranged about 25 per cent. smaller than in the standard albinos. Likewise the ratios of the diameter of the nucleus to that of the cell were less in the inbred specimens. The nucleus plasma ratios were only about half as great in the inbred as in the standard albino. These results are all the more interesting in view of the fact that average body weight in inbreeding does not show this diminution. Comment on these findings is reserved until further studies have been made.

R. H. WHEELER (Oregon)

526. CROZIER, W. J., "Homing" Behavior in *Chiton*. *Amer. Nat.*, 1921, 55, 276-281.

This discussion is a brief supplement to Arey and Crozier in *Proc. Nat. Acad. Sci.*, Vol. 4, 1918, 319-321, and contains brief data on the movements of various individual mollusks to their shelters in the rocks. If not moved more than 1.5 meters from their shelter they will return. Beyond that distance they seek another more or less permanent site. Light, wave pressures and possible other direct stimulation may account for these movements but at the same time this behavior may represent the incipient stage of a "homing instinct" found more highly developed in other forms such as the limpet.

R. H. WHEELER (Oregon)

527. GREENBERG, B., Society Becoming Self-Conscious. *Social Hygiene*, 1921, 7, 297-302.

The British National Birth-Rate Commission makes the general agreements: (1) that abortion is ethically indefensible, except under medical direction with a view to removing serious risk to the mother; (2) that persons who are likely to transmit any serious physical or mental taint should not have children; (3) that no means of preventing conception can be tolerated that may injure the health of potential parents or of children; (4) that no person should refuse the duties of parenthood for purely selfish reasons; (5) that while parents cannot be relieved of their responsibility, it is, nevertheless, the duty of society to remove disabilities that may be imposed on worthy parents without any fault of theirs; and (6) that instruction should be given especially to young persons in the laws of sex hygiene, the prevalence and dangers of venereal disease, etc.

At every point the problems considered by the Commission and the suggestions and facts presented by the witnesses lead to fundamental biological and economic factors. Social hygiene as a body of thought may perhaps carry on in total disregard of the surrounding conditions, but the health of society is impossible when the mass of peoples lives in ignorance, privation, and squalor. The theorizing of experts, the exhortation of moralists, and the orations of statesmen will not do anything to increase birth-rates, diminish morbidity or mortality, or lessen the misery and anguish of sufferers, so long as the concern remains with empire or nation or trade balance rather than with the kind of organisms that make up nations and empires.

M. E. GALLAGHER (Pennsylvania)

## NOTES AND NEWS

DR. C. A. RUCKMICK, of the University of Illinois has accepted an appointment as associate professor of psychology at Wellesley College.

PROFESSOR E. G. BORING of Clark University is to lecture at the Summer School of Stanford University.

PROFESSOR M. BENTLEY is to lecture at the Summer School of the University of California.

THE department of psychology and education of Antioch College, which is starting the new educational experiment will consist of the following:—Professor of psychology and Director of the Laboratory, Dr. H. B. English; Professor of Philosophy, Dr. S. F. Weston; Professor of Education, Mr. A. A. Hauck; Associate Professor of Education, Mrs. E. D. Everdell; Director of Personnel Administration, Mr. H. L. Gardner and Associate Director of Personnel Administration, Miss K. Huey.

SOME extra copies of the portrait of Wundt, published in the May number of the *Psychological Review*, have been printed, and may be purchased from the business office of the Psychological Review Company, Princeton, N. J., at 25 cents each.

THE degree of Doctor of laws has been conferred on Dr. J. R. Angell by Princeton, Yale, Harvard and Columbia Universities at the time of his becoming President of Yale University.

PROFESSOR HENRI BERGSON has retired from the chair of philosophy at the Collège de France.

DR. P. T. YOUNG, of the University of Minnesota, has been appointed associate in psychology at the University of Illinois.

DR. F. P. GRAVES, dean of the school of education of the University of Pennsylvania, has been appointed commissioner of education of the state of New York and president of the University of the State of New York.



DR. J. T. METCALF, of George Washington University, has been appointed associate professor of psychology at the University of Vermont. Mr. F. A. Moos, development specialist at Camp Dix, N. J., will fill the vacancy at George Washington University.

MR. CARVETH READ has been made emeritus professor of philosophy and comparative psychology in the University of London.

PROFESSOR M. DEWULF, formerly of the University of Louvain has been appointed professor of philosophy at Harvard University.

A statue of Donders was recently unveiled at Utrecht where he had been professor of ophthalmology and physiology until his death in 1889.

WITH the issue of July the *American Journal of Insanity* changes its name to (and begins as a new series) the *American Journal of Psychiatry*. The editorial board, ownership, etc., remain as in the past.

THE New York State Association of Consulting Psychologists has been organized for the purposes of: "The promotion of high standards of professional qualifications for consulting psychologists" and "Stimulating research work in the field of psychological analysis and evaluation." Membership is limited to those who have the minimum requirements of two years graduate work in psychology. The Executive Committee for the current year are: D. Mitchell, President; L. A. Pechstein, vice-president; E. A. Walsh, secretary-treasurer; E. E. Farrell; S. B. Heckman; L. S. Hollingworth; and R. S. Woodworth.

PROFESSOR G. T. LADD, professor emeritus of philosophy at Yale University and second president of the American Psychological Association, died on August 8, at the age of seventy-nine years.

THE Western Association of Psychologists met August 4-6 with the Western Division of the American Association for the Advancement of Science. The program announced the following papers: The learning curve and its application to efficiency, E. K. Strong, Carnegie Institute of Technology; Tentative results of a study of the influence of intelligence on the form of the learning curve for different types of material, G. M. Ruch, Stanford Univer-

sity; Employment of the learning process in clinical psychology, G. S. Snoddy, University of Utah; The effect of kinaesthetic factors in the learning processes of first grade children, with special reference to reading and spelling, G. M. Fernald, University of California; The organization of mental functions, T. L. Kelley, Stanford University; The south Italian in the American city, O. L. Bridgmen, University of California; Mental differences in certain immigrant groups in California, K. Young, University of Oregon; Comparison of the mentality of Chinese and American children, S. Lee, University of California; Progress in the study of gifted children at Stanford University, L. M. Terman, Stanford University; Progress rate and Intelligence, A. A. Richards, San Francisco Normal; Some data on anatomical age and its relation to intelligence, H. Woodrow, University of Minnesota; The effect of the group upon test scores, E. S. Conklin, University of Oregon; A study of musical inferiority, E. A. Gaw, San Francisco State Normal; Results of statistical studies of inheritance, R. Franzen, Bureau of Educational Research, Des Moines; Preliminary results on the intellectual resemblance of twins, C. Merriam, Stanford University; How can the psychologist help in the solution of problems in the public elementary and secondary schools? V. E. Dickson, Oakland Public Schools; The influence of subliminal stimuli upon guessing, J. E. Coover, Stanford University; Binaural localization of tones and the Bernstein theory, E. G. Boring and H. M. Halverson, Clark University; Fusion and local sign in the retina, J. V. Breitweiser, University of California; The Yerkes multiple choice method with human subjects, W. Brown, University of California; A new formula for behaviorism, E. C. Tolman, University of California; How intelligently do beavers work? W. E. Ritter, Scripps Institute for Biological Research; Effect of punishment upon maze learning by rats and human beings, G. Montgomery, University of California; The nature of unsuccessful acts and their order of elimination in animal learning, Z. Y. Kuo, University of California. The meetings were held in the Psychology Building of the University of California. A dinner for psychologists was held at the Hotel Whitecotton on August 4th.

